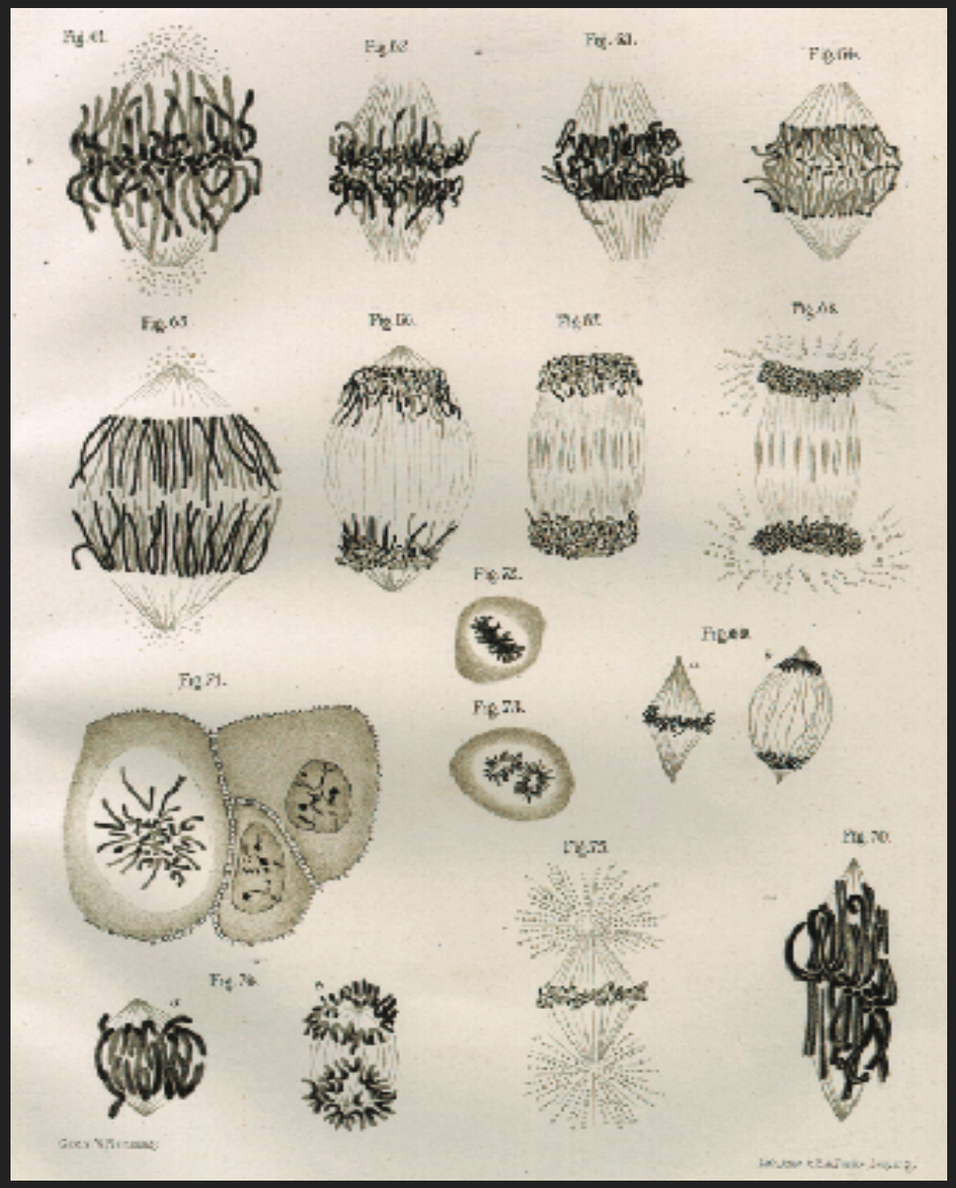
INTRODUCTION TO MEIOSIS

THE CELL & INHERITANCE

In the early 1900's, scientists were working to identify the cell structures that carried Mendel's hereditary factors, or genes.

In 1903, Walter Sutton observed that sex cells in grasshoppers had half the number of chromosomes as the body cells. Sutton wanted to understand how sex cells form.

CHROMOSOMES & INHERITANCE



He also noticed that each grasshopper had exactly the same number of chromosomes in its body cells as each of the parents.

Sutton reasoned that the chromosomes in body cells actually occurred in pairs, with one chromosome in each pair coming from the male and the other coming from the female. Sutton realized that paired alleles were carried on paired chromosomes.

From his observations, Sutton concluded that genes are located on chromosomes.

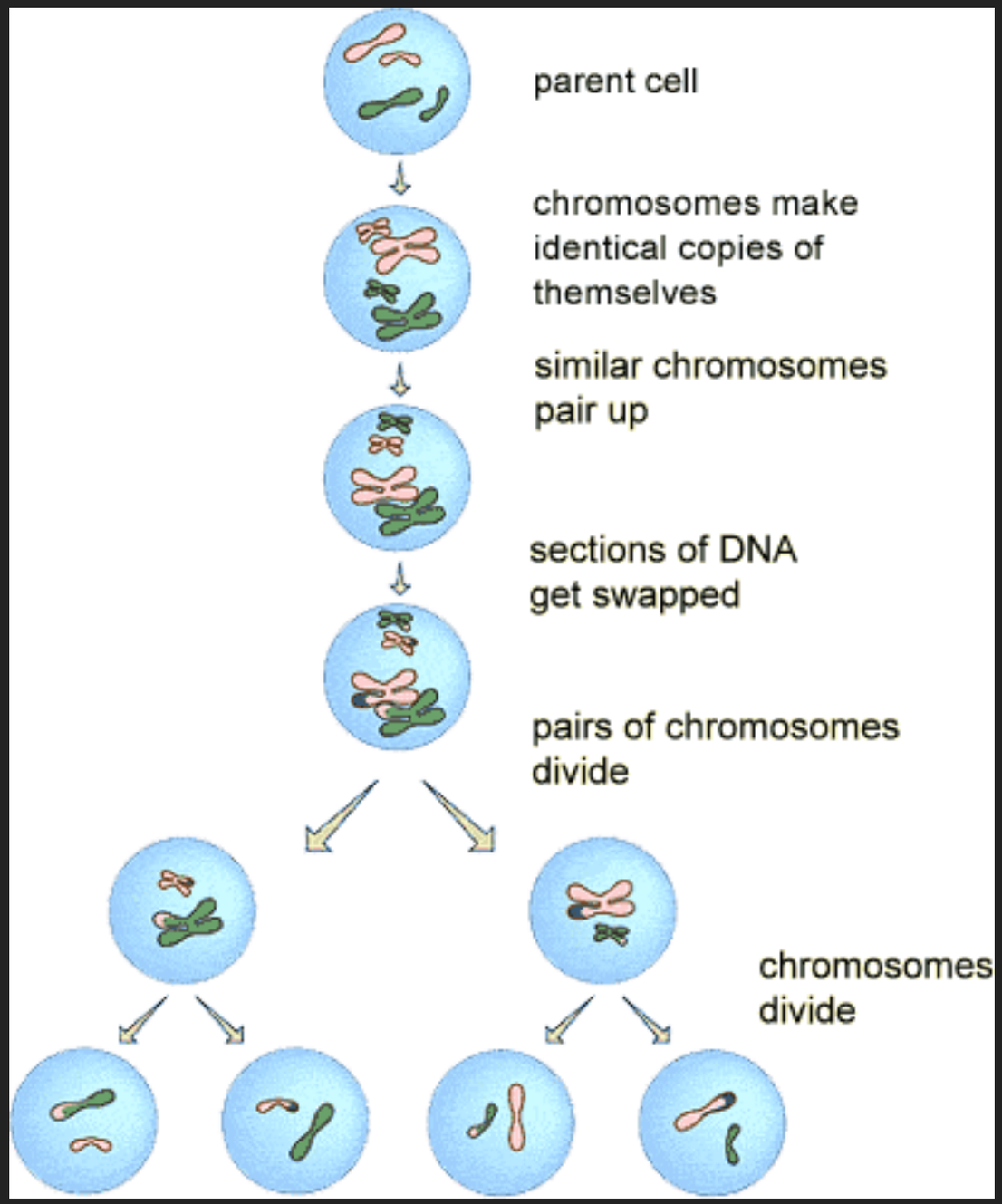
He proposed the chromosome theory of inheritance. According to the chromosome theory of inheritance, genes are carried from parents to their offspring on chromosomes.

MEIOSIS

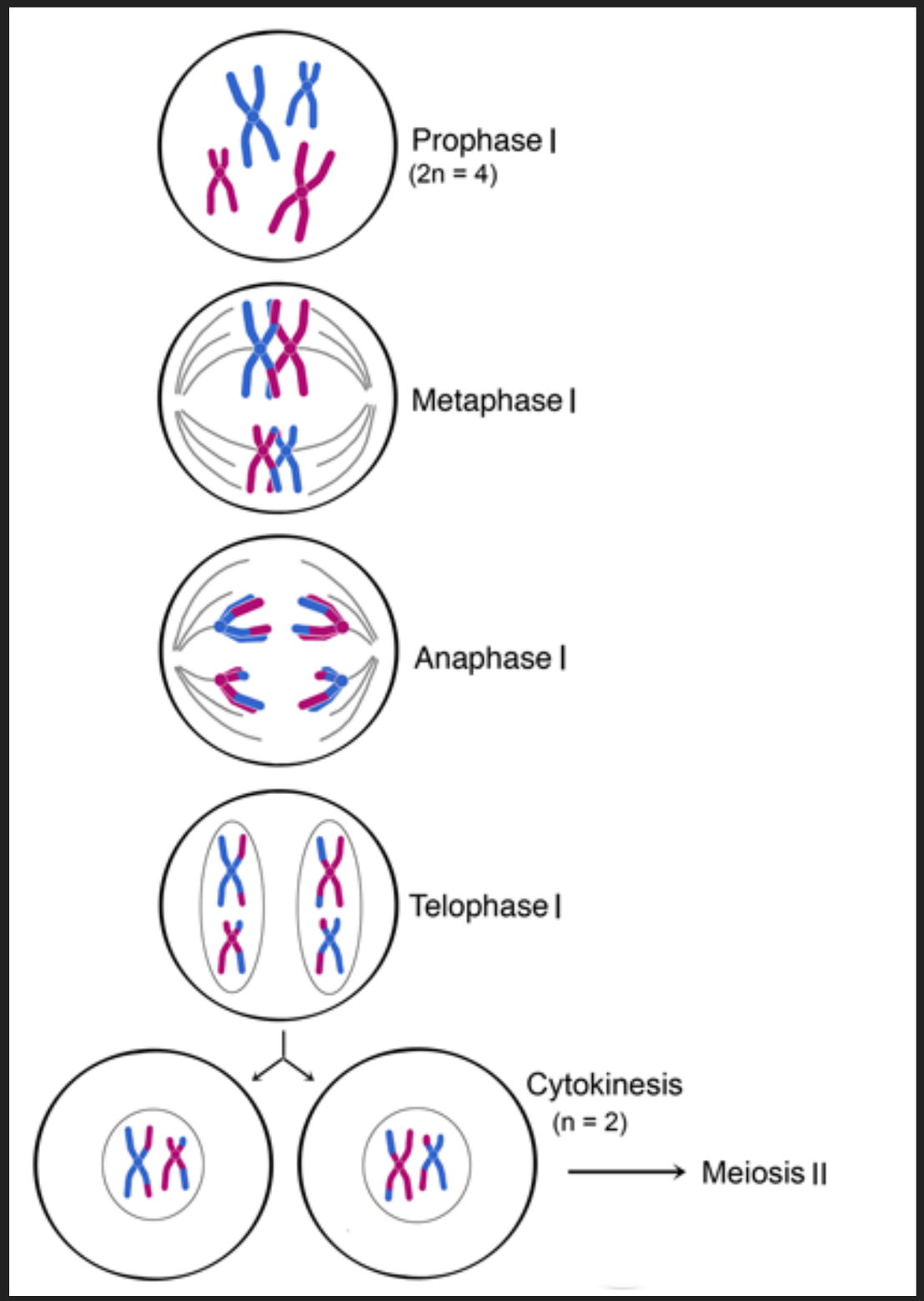
Organisms produce sex cells during meiosis. Meiosis is the process by which the number of chromosomes is reduced by half to form sex cells – sperm and eggs.

When they combine, each sex cell contributes half the number of chromosomes to produce offspring with the correct number of chromosomes.

During meiosis, the chromosome pairs seperate and are distributed to two different cells. The resulting sex cells have only half as many chromosomes as the other cells in the organism.



MEIOSIS 1



Before Meiosis begins, every chromosome in the parent cell is copied. Centromeres hold the two chromatids together.

Meiosis 1

The chromosome pairs line up in the center of the cell. The pairs separate and move to opposite ends of the cell.

Two cells form, each with half the number of chromosomes. Each chromosome still has two chromatids.

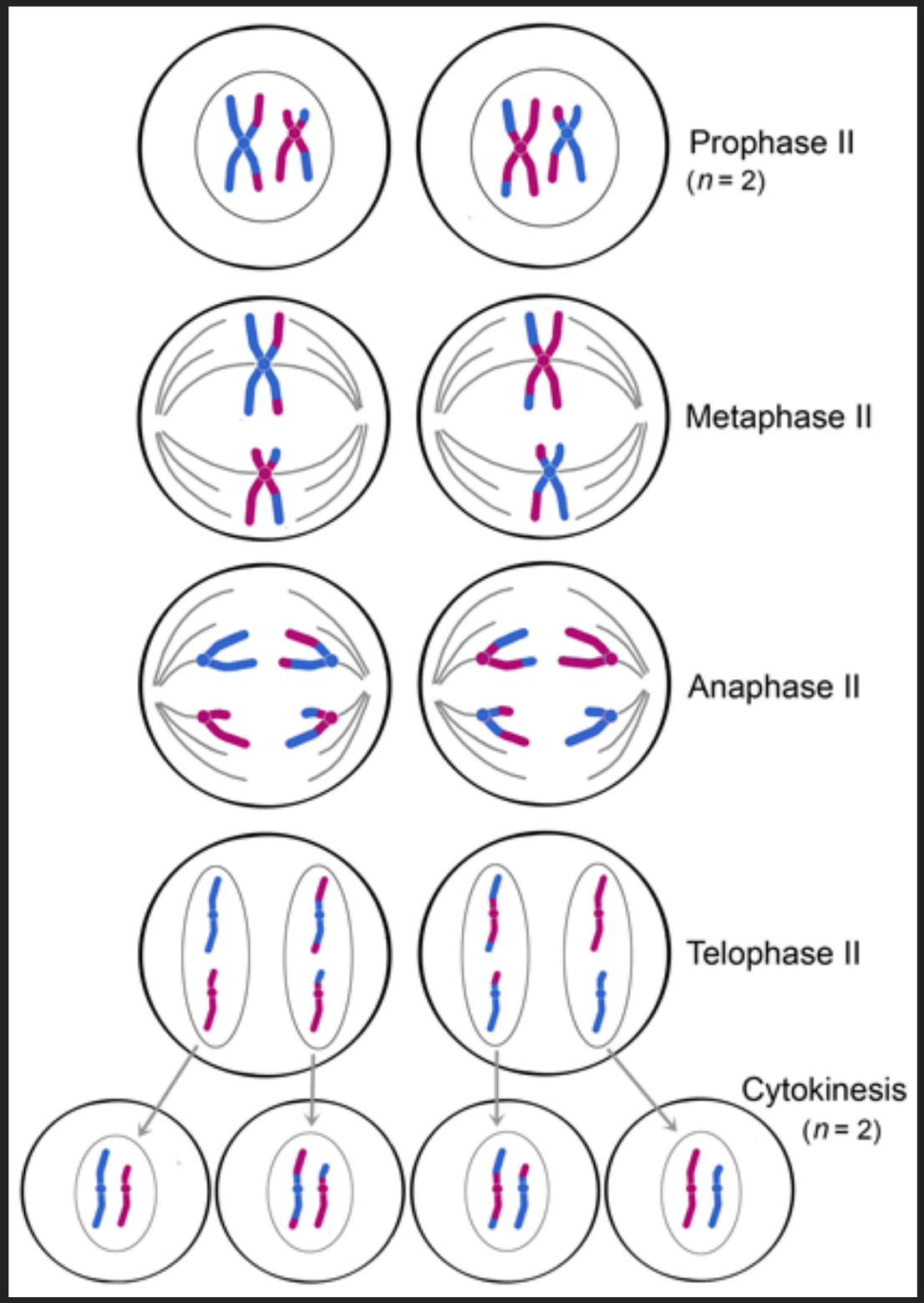
Meiosis 2

The chromosomes with their two chromatids move to the center of the cell. The centromeres split, and the chromatids separate.

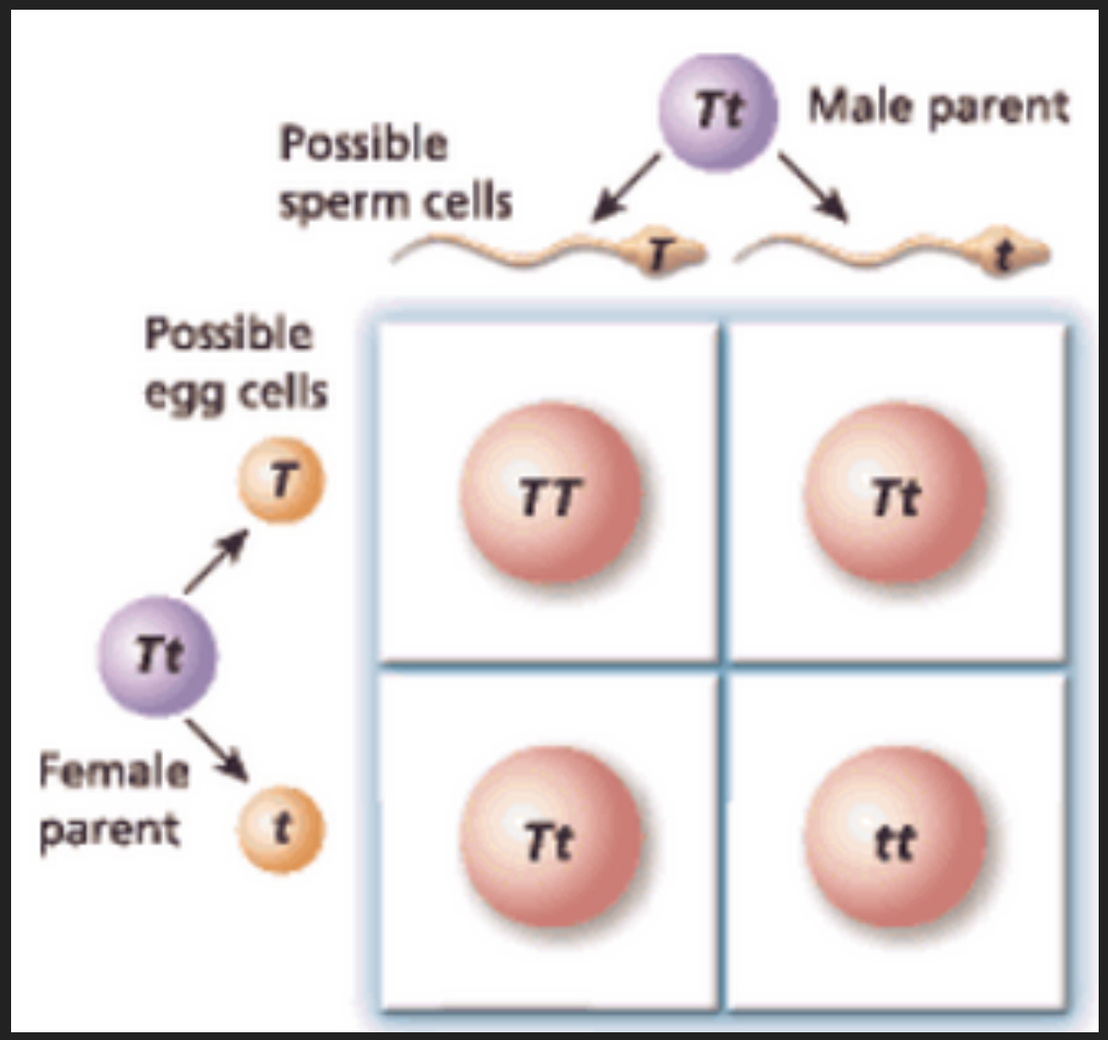
End of Meiosis

Four sex cells have been produced. Each cell has only half the number of chromosomes that the parent cell had at the beginning of meiosis.

Each cell has only one chromosome from each original pair.



PUNNETT SQUARES



Punnett squares show the results of meiosis. When chromosomes pairs separate, so do the alleles carried on the chromosomes. One allele from each pair goes to each sex cell.

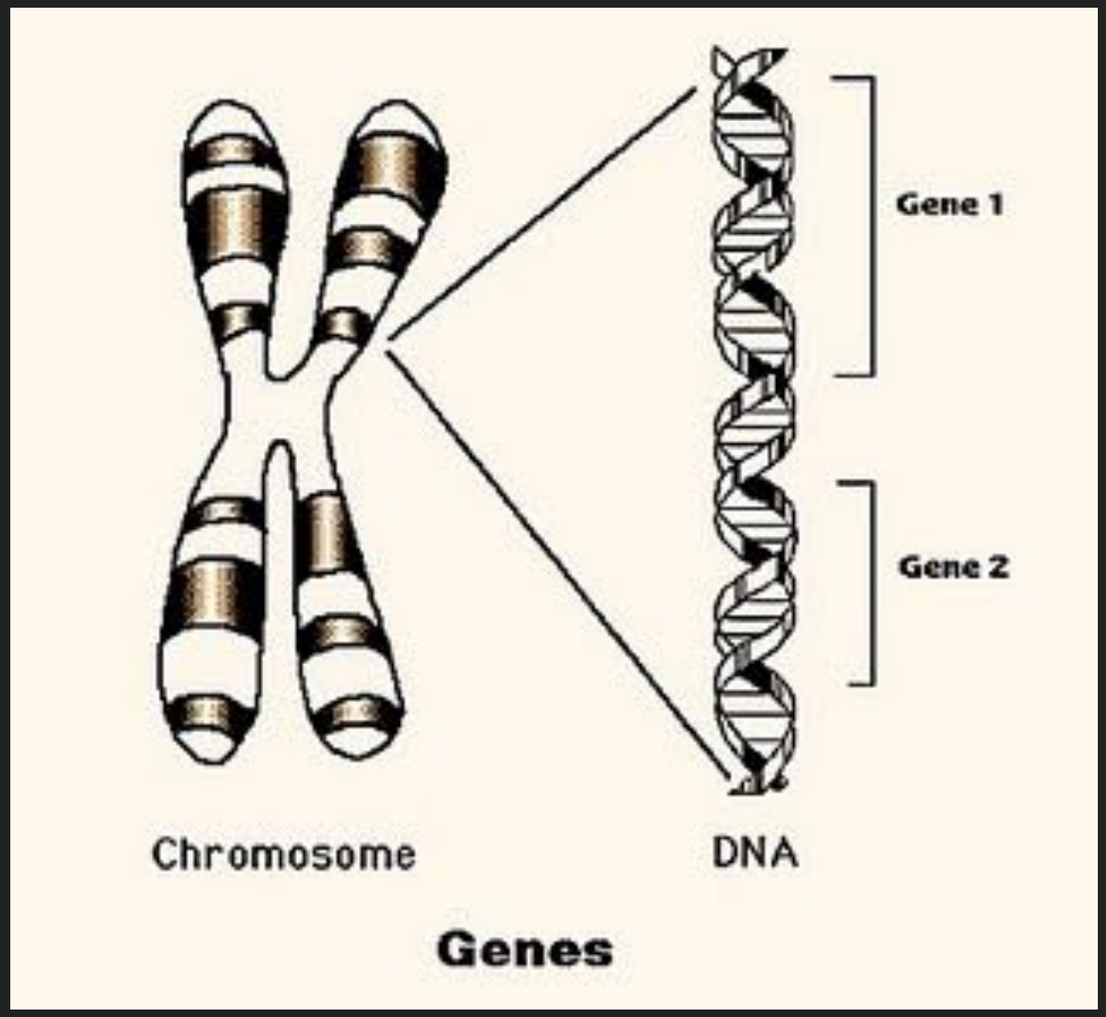
A punnett square will show this when you place each symbol for the allele in a box, one from each parent.

A LINE UP OF GENES

Chromosomes are made up of many genes joined together like beads on a string. Each chromosome contains a large number of genes, each gene controlling a particular trait.

However, the alleles for some of the genes might differ from each other, making the organism heterozygous for some traits. If the alleles are the same, the organism is homozygous for those traits.

Although you have 23 pairs of chromosomes, or 46 chromosomes total, your body cells each contain about 35,000 genes. Each gene controls a trait.



KEYWORDS: ENGLISH - SPANISH

Meiosis - Meiosis

Chromosome Theory of Inheritance

Teoría cromosómica de la herencia